Any backfill material required by construction procedures to extend outside the MSE Wall volume is considered incidental. Include this cost in the price bid for contract items.

E. Concrete Leveling Pads

Concrete leveling pads, including steps shown in the Plans will not be paid for separately.

F. Cast-in-place Coping A, Cast-in-place Coping B, Precast Coping, Traffic Barrier V, Traffic Barrier H, mounted atop the MSE Wall

These units, complete in place and accepted, will be designated on the Plans and paid for at the Contract Unit Price bid per linear foot (meter) for each type unit.

G. Dewatering

No separate payment will be made for dewatering. Include the cost of dewatering in the price bid for special embankment backfill.

Payment will be made under:

Item No. 627	MSE wall face, wall No. __0 -10 ft (0 -3 m)	Per square foot (meter)
Item No. 627	MSE wall face, wall No. __>10 -20 ft (3 -6 m)	Per square foot (meter)
Item No. 627	MSE wall face, wall No. __>20- 30 ft (6 -9 m)	Per square foot (meter)
Item No. 627	MSE wall face, wall No. __>30 ft (6 -9 m)	Per square foot (meter)
Item No. 627	Coping, A, wall No. ___	Per linear foot (meter)
Item No. 627	Coping, B, wall No.___	Per linear foot (meter)
Item No. 627	Traffic barrier, H, wall No.___	Per linear foot (meter)
Item No. 627	Traffic barrier, V, wall No.___	Per cubic yard (meter)
Item No. 627	Additional MSE backfill	Per cubic yard (meter)

627.5.01 Adjustments

General Provisions 101 through 150.

Section 631—Permanent Changeable Message Signs

631.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 632—Portable Changeable Message Signs

632.1 General Description

This work includes furnishing, maintaining, transporting, and using Portable Changeable Message Signs according to these Specifications at locations shown on the Plans, in the Special Provisions, or as directed by the Engineer.

632.1.01 Definitions

General Provisions 101 through 150.

632.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

MUTCD

NCHRP 350

QPL 82

632.1.03 Submittals

General Provisions 101 through 150.

632.2 Materials

General Provisions 101 through 150.

632.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

632.3 Construction Requirements

632.3.01 Personnel

General Provisions 101 through 150.

632.3.02 Equipment

Ensure Portable Changeable Message Sign (PCMS) equiment meets the following requirements:

A. PCMS meet the minimum requirements of the MUTCD.

B. PCMS are listed on QPL 82 as maintained by the Office of Materials and Research or have a letter of approval from the Office of Materials and Research before the sign is used on any portion of the work.

C. PCMS that remain the property of the Contractor may be either new or used provided the PCMS meets the requirements of this Subsection.

D. The message displayed on the sign is visible for one-half mile (800 m) and legible for not less than 650 ft (198 m) during both daytime and nighttime operation.

E. The sign is capable of presenting three lines of message copy.

F. Each line is capable of displaying eight (8) characters in various alpha, numeric, and alphanumeric combinations.

G. In addition to the alphanumeric combinations, the signs include the capability to display directional arrow messages. A PCMS may be used as an arrow board display panel provided the PCMS meets the size and display requirement of a Type C panel as defined by the MUTCD.

H. The sign is capable of displaying at least three messages sequentially.

I. The entire message cycle is readable at least twice by the motorists when traveling at the posted speed limit.

J. Messages are displayed in preferrably one phase but no more than two phases. The use of a message that requires more than two phases to convey the message shall have the prior approval of the Engineer.

K. The legend for each line of the message board is a minimum of 17 in. (430 mm)in height, single stroke, and proportionally spaced.

L. The bottom of the sign face is 7 ft. (2.1 m) from the ground when operating.

M. The complete message sign unit is designed and certified to operate in ambient air temperatures ranging from –20 ^{o}F (-29 ^{o}C) to 140 ^{o}F (60 ^{o}C). The sign unit and its operation is not affected by adverse weather conditions.

N. The sign is capable of operating for twenty-four (24) hours a day for two weeks continuously without interruption of service and without the need for auxiliary power sources. Power sources requiring the use of fuel have sufficient storage capacity for forty-eight (48) hours of continuous operation without refueling.

O. The message board has a dark background with lamps, discs, light emitting diodes (LED's), or other approved illumination for displaying the message.

1. The light source does not alter the yellow color for flip-disc type signs or change the appearance of the background.

2. The message board is shielded or shaded from direct sunlight to insure readability of the message.
3. The sign has both automatic and manual dimming capabilities for the light sources to maintain proper intensity for day and night operation.

P. The controller is mounted in a lockable, weatherproof cabinet secured to the trailer and easily removed for service via plug-in connections.

Q. The entire sign is shielded from interference from mobile radio and cell phone transmissions

R. The PCMS has the following programmed as permanent messages:

1) /KEEP/RIGHT/ /
2) /KEEP/LEFT/ /
3) /TWO WAY/ TRAFFIC/AHEAD/
4) /ONE LANE/BRIDGE/AHEAD/
5) /MERGING/TRAFFIC/AHEAD/
6) /HEAVY/TRAFFIC/AHEAD/
7) /BUMP/AHEAD/ /
8) /PAINT/CREW/AHEAD/
9) /LOOSE/GRAVEL/AHEAD/
10) /SURVEY/PARTY/AHEAD/
11) /ICY/BRIDGE/AHEAD/
12) /ROUGH/ROAD/AHEAD/
13) /DO/NOT/PASS/
14) /LOW/SOFT/SHOULDER/ /
15) /SHOULDER/DROPOFF/ /
16) VEHICLES/CROSSING/ROADWAY/
17) /DETOUR/AHEAD/ /
18) /MERGE/RIGHT/AHEAD/
19) /MERGE/LEFT/AHEAD/
20) /TRAFFIC/ACCIDENT/AHEAD/
21) /TRAFFIC/SLOWS/AHEAD/
22) /ROAD/NARROWS/AHEAD/
23) /LEFT/LANE/NARROWS/
24) /RIGHT/LANE/NARROWS/
25) /LANE/NARROWS/AHEAD/
26) /LEFT/LANE/ /
27) /RIGHT/LANE/ /
28) /LEFT/SHOULDER/ /
29) /RIGHT/SHOULDER/ /
30) /CLOSED/AHEAD/ /

S. The PCMS is capable of having at least eighty (80) additional messages added to the above list of permanent messages and has the capacity to create at least one-hundred (100) additional messages in the field by use of the controller.

T. The PCMS is capable of being pre-programmed to automatically change to any pre-selected default message should any component on the sign fail.

U. The PCMS is entirely mounted on a trailer that meets all of the requirements of the Georgia Vehicle Code. Additional trailer requirements:

1. The trailer and the components of the sign is designed to allow one person to perform all transporting and operating functions without assistance.
2. The trailer is designed for unlimited on-highway travel at 70 mph (110 kph).

3. The trailer has a minimum of four outrigger type leveling jacks, one at each corner of the trailer deck.
4. The jacks are mounted to allow them to swivel into a locked position for secure storage during travel.
5. The trailer and all mounted equipment are structurally adequate for unlimited normal operation in wind velocities up to 80 mph (130 kph).

632.3.03 Preparation

General Provisions 101 through 150.

632.3.04 Fabrication

General Provisions 101 through 150.

632.3.05 Construction

A. Utilization Requirements

1. When set up as a Pay Item in the Contract, utilize PCMS whenever any condition(s) exists that would require extra emphasis in warning motorists of a situation or at any location as directed by the Engineer. Furnish PCMS and have them available on a continuous basis.
2. Use PCMS on Interstate and multi-lane highways when any of these conditions exist:
   a. Workers or equipment operating with in 2 ft. (600 mm) of a travel lane without appropriate traffic control devices for positive barrier protection.
   b. Excavation or other construction creates drop-offs adjacent to the edge of a travel lane and channelization devices are placed within the travel lane that is adjacent to the drop-off.
   c. Material hauling in or out of a travel lane by hauling vehicles requires traffic to slow in the temporary traffic control zone.
   d. Traffic is delayed by pacing all lanes for short periods of time for placing bridge beams, overhead sign structures, blasting, etc.
   e. Any time that divided highway traffic is required to operate as two-way traffic condition and traffic is not separated by a positive barrier system.
3. Use PCMS on all other types of roadways according to the the traffic control plan or as directed by the Engineer.
4. Locate the PCMS near the construction activity and display a message that is both concise and meaningful. Obtain the Engineer's approval for messages used on the PCMS.
5. Include the location of the PCMS and any message to be displayed on the PCMS in the approved traffic control plan required in Section 150-Traffic Control.
6. For emergency situations, PCMS that are smaller in size and do not have all of the capabilities outlined in this Specification, may be used until a PCMS that meets these requirements can be located and placed in operation at the site.

   The Engineer will determine when conditions and situations are to be considered emergencies and will regulate the length of time that non-specification PCMS may be used.

   Provide the Engineer written notification when non-specification PCMS signs are in use on the work.

B. PCMS Phase Messages

1. The first phase directs the motorist to take a specific action, such as MERGE/RIGHT, KEEP/RIGHT, OR REDUCE / SPEED.
2. The second phase, if necessary, is used to inform the motorist of road conditions such as LEFT/LANE/CLOSED; LANE/NARROWS/AHEAD; WATER/IN/ROAD; SHOULDER/DROP OFF; TRUCKS/IN AND/OUT.
3. Do not use messages such as USE/CAUTION; HAZARD/AHEAD; or DANGER which are confusing and give no guidance to the motorist. Also, do not use messages such as BUCKLE/UP or DRIVE/SAFELY which diminish the impact of important and relevant messages.

C. Protection

1. Unless a PCMS is protected by positive barrier such as guardrail or temporary concrete median barrier, place a minimum of three (3) drums on the approaching traffic side of the PCMS to delineate the base of the sign.
2. Remove PCMS from the roadway when not in use unless the sign is located a minimum of 34 ft. (10.4 m) from the edge of the travelway or protected by positive barrier. When a PCMS is not displaying a message, turn the message panel away from the approaching traffic.

632.3.06 Quality Acceptance

General Provisions 101 through 150.

632.3.07 Contractor Warranty and Maintenance

Keep the units in good repair and neat and clean in appearance. If the unit fails, malfunctions, or is damaged, immediately repair the unit and furnish flaggers or other approved means to safely control the traffic until the units are back in service. Make repairs or replace the unit within 24 hours. Maintenance also includes periodically cleaning the units.

632.4 Measurement

Changeable message signs, complete with trailer and generating equipment are measured by the unit.

632.4.01 Limits

General Provisions 101 through 150.

632.5 Payment

Changeable message signs, complete with appurtenances, will be paid for at the Contract Unit Price Per Each. Payment is full compensation for furnishing, using, and maintaining the signs for the duration of The Work. Each PCMS will be paid for only one time. The PCMS will remain the property of the Contractor.

Payment will be made under:

Item No. 632	Changeable message sign, portable, type3	Per each

632.5.01 Adjustments

General Provisions 101 through 150.

Section 633—Modification of Existing Signs

633.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 634—Monuments and Road Markers

634.1 General Description

This work includes furnishing and erecting monuments, name plaques—special design, county line markers, and right-of-way markers.

634.1.01 Definitions

General Provisions 101 through 150.

634.1.02 Related References

A. Standard Specifications

Section 500—Concrete Structures

B. Referenced Documents

General Provisions 101 through 150.

634.1.03 Submittals

General Provisions 101 through 150.

634.2 Materials

Ensure that concrete is Class A or a mix approved by the Engineer that provides a cement factor of at least 5.85 CWT/yd^3 (347 kg/m^3) of concrete. Use a test specimen cut from a monument or marker using the proposed concrete design and manufacturing method to prove the concrete meets a compressive strength of at least 2,000 psi (14 MPa) at 7 days.

Ensure that concrete is reinforced, free of honeycomb, has uniform surfaces, and meets the applicable requirements of Section 500.

All other materials used will be those specified on the Plans or in the Proposal.